IPD FRS & FRD Series of 5 to 6 Watt DC/DC Converters IPD

FRS and FRD Families are
INDUSTRY - STANDARD DC/DC CONVERTERS WITH SINGLE OR DUAL REGULATED OUTPUTS. ALL MODELS FEATURE SIX-SIDED EMI/RFI SHIELDING AND AUTOMATIC RESTART UPON REMOVAL OF SHORT CIRCUIT. AN INTERNAL ð(P1) INPUT FILTER IS STANDARD FOR THESE SERIES TO MINIMIZE REFLECTED RIPPLE CURRENT FOR CRITICAL APPLICATIONS.

ELECTRICAL SPECIFICATIONS

All Specifications Typical @+25°C, Nominal Line, and Full Load Unless Otherwise Noted.

INPUT SPECIFICATIONS	
Input Voltage Range	See Table Below
Input Filter	ð(Pi) Filter
OUTPUT SPECIFICATIONS	
Voltage Accuracy	±1.0%, max.
Ripple and Noise, 20MHzBW1mVRMS,max.	
20 MHz BW	40 m Vp-p, max.
Average Voltage Temp. Coefficient±0.02%°C,max.	
Short Circuit Protection	Continuous
Short Circuit Restart	Automatic
GENERAL SPECIFICATIONS	
Isolation Voltage	500 VDC,min.
Isolation Resistance	$> 10^9$ Ohms
Switching Frequency	20 KHz, typ.
ENVIRONMENTAL SPECIFICATIONS	
Operating Temperature Range=25°C to +71°C	
Surface Temp. Rise Above Ambient10°C/Walt Diss.	
Derating	None
Storage Temperature Range	-40°C to +125°C
Humidity	20% to 95% R.H. (non-condensing)
Cooling	Free-Air Convection
EMI/RFI	Six-Sided Continous Metal Case
PHYSICAL SPECIFICATIONS	
Dimensions	2.0 x 2.0 x 0.40 Inches (51 x 51 x 10.16 mm)
Weight	2.2 Oz. (60 g)
Case Material	Black Coated Copper (With Non-Conductive Header)

OPTIONS AVAILABLE:
(Refer to Accessories Page 63, or Consult Factory)

- NON-STANDARD INPUT/OUTPUT VOLTAGES
- EXTENDED TEMPERATURE RANGE
- SPECIAL PACKAGING (MODULE SIZE)
- PHENOLIC CASE (ADD SUFFIX "P")
- MATING SOCKET: ADD SUFFIX "MS/C"
- REGULATORY AGENCY APPROVALS
- WATER-WASHABLE SEALED CASE: ADD SUFFIX "Z"
- FOR OTHER OPTIONS, CONSULT FACTORY

APPLICATIONS:

- A/D-D/A CONVERTERS
- TELECOMMUNICATIONS
- PROCESS CONTROL EQUIPMENT
- LOCAL POWER DISTRIBUTION

NOMINAL INPUT VOLTAGE	INPUT VOLTAGE RANGE @ RATED OUTPUT LOAD			
	50%	80%	80%	100%
5	4.3–6.0	4.4–5.7	4.55–5.6	4.65–5.5
12	10.3–15.0	10.4–14.6	10.6–13.6	10.9–13.2
24	20.4–30.0	20.6–29.0	21.0–27.0	21.6–26.4
28	24.2–36.0	24.5–34.0	24.9–31.8	25.2–30.8
48	41.3–60.0	42.0–58.0	42.3–54.4	43.2–52.8

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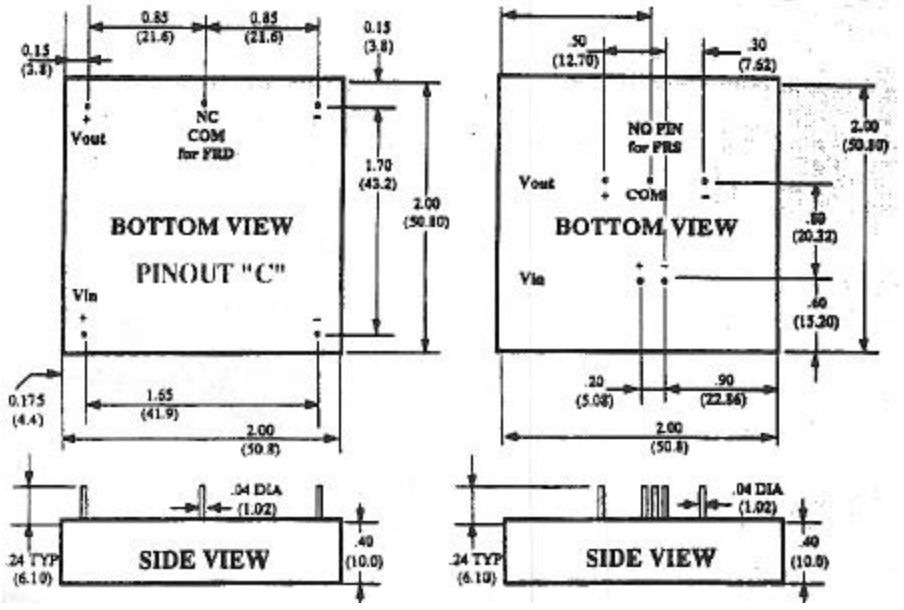
INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT NO LOAD	INPUT CURRENT FULL LOAD	?? EFF	REGULATIONS LINE	REGULATIONS LOAD	MODEL NUMBER
4.65 - 5.50	5VDC	1000mA	225mA	1563mA	64	±0.15%	±0.15%	FRS505
	12VDC	470mA	167mA	1589mA	71	±0.15%	±0.15%	FRS512
	15VDC	400mA	159mA	1714mA	70	±0.15%	±0.15%	FRS515
	±12VDC	±230mA	152mA	1698mA	65	±0.15%	±0.15%	FRD512
	±15VDC	±190mA	147mA	1727mA	66	±0.15%	±0.15%	FRD515
10.9 – 13.2	5VDC	1000mA	61mA	683mA	61	±0.15%	±0.15%	FRS1205
	12VDC	470mA	30mA	691mA	68	±0.15%	±0.15%	FRS1212
	15VDC	400mA	30mA	746mA	67	±0.15%	±0.15%	FRS1215
	±12VDC	±230mA	49mA	697mA	66	±0.15%	±0.15%	FRS1212
	±15VDC	±190mA	46mA	709mA	67	±0.15%	±0.15%	FRD1215
21.6 – 26.4	5VDC	1000mA	31mA	353mA	66	±0.15%	±0.15%	FRD2405
	12VDC	470mA	28mA	356mA	67	±0.15%	±0.15%	FRS2412
	15VDC	400mA	33mA	362mA	59	±0.15%	±0.15%	FRS2415
	±12VDC	±230mA	21mA	343mA	67	±0.15%	±0.15%	FRD2412
	±15VDC	±190mA	22mA	365mA	65	±0.15%	±0.15%	FRD2415
25.2 – 30.8	5VDC	1000mA	15mA	270mA	66	±0.15%	±0.15%	FRS2805
	12VDC	470mA	15mA	272mA	74	±0.15%	±0.15%	FRS2812
	15VDC	400mA	15mA	325mA	66	±0.15%	±0.15%	FRS2815
	±12VDC	±230mA	26mA	303mA	65	±0.15%	±0.15%	FRD2812
	±15VDC	±190mA	23mA	313mA	65	±0.15%	±0.15%	FRD2815
43.2 – 52.8	5VDC	1000mA	15mA	153mA	68	±0.15%	±0.15%	FRS4805
	12VDC	470mA	15mA	180mA	65	±0.15%	±0.15%	FRS4812
	15VDC	400mA	15mA	181mA	69	±0.15%	±0.15%	FRS4815
	±12VDC	±230mA	14mA	176mA	65	±0.15%	±0.15%	FRD4812
	±15VDC	±190mA	16mA	180mA	66	±0.15%	±0.15%	FRD4815

NOTE: FOR "C" PINOUT, PLEASE ADD SUFFIX `C' TO THE PART NUMBER. EXAMPLE: FRD4815C

ALL DIMENSIONS IN INCHES (MM) Specifications Subject to Change Without Notice.



Jameco Part number 124169

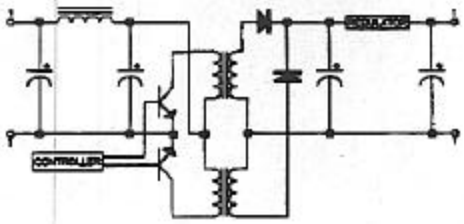
All Mechanical Tolerances are ±0.020"

FR Series of 5 to 6 Watt DC/DC Converters

STANDARD DC/DC CONVERTERS WITH SINGLE OR DUAL REGULATED OUTPUTS. ALL MODELS FEATURE THREE TERMINAL OUTPUT REGULATORS FOR TIGHT LINE AND LOAD REGULATION. AN INTERNAL Π(Pi) INPUT FILTER IS STANDARD AND IS USED TO REDUCE REFLECTED RIPPLE CURRENT. ALL MODELS FEATURE A NICKEL-PLATED COPPER CASE WITH SIX-SIDED EMI/RFI SHIELDING.

DIMENSIONS:
2.00" x 2.00" x 0.40"
(50.80) x (50.80) x (10.16)mm

BLOCK DIAGRAM



FEATURES

- Industry Standard Pin Out
- Six-Sided Shielding
- 500 VDC I/O Isolation
- Continuous Short Circuit Protection
- Input Π (Pi) Filter
- Up to 74% Efficiency

APPLICATIONS

- A/D and D/A Converters
- Telecommunication
- Process Control Equipment
- Local Power Distribution

PART NUMBER SELECTION GUIDE

F R S 48 05 MS - C

F	R	S	48	05		MS - C
SERIES NAME	FEATURES	# OF OUTPUTS	Vin NOMINAL	Vout SINGLES DUALS	OPTIONS	ACCESSORIES / TYPE

Features
- Series Pass Transistor
- Regulated

# of Outputs
S = SINGLE
D = DUAL

Input Voltage Range (VDC)
5 = 4.65 to 5.50
12 = 10.9 to 13.2
24 = 21.6 to 26.4
28 = 25.2 to 30.8
48 = 43.2 to 52.8

Output Voltage (VDC)

Single Output:
05 = 5V @ 1000mA
12 = 12V @ 470mA
15 = 15V @ 400mA

Dual Output:
12 = ±12V @ ±230mA
15 = ±15V @ ±190mA

For Other Output Voltages Please Consult Factory

Options
S (#) = Modification Number
I = Industrial Temperature Range (-40°C to +85°C)
Z = Water-washable sealed case

Accessories / Type
MS = Mating Socket
Type = C *Please Consult Accessories Page for Mating Socket Selection.*

INTERNATIONAL POWER DEVICES, INC.
20 Linden Street, Boston, MA 02134 • Phone: (617)782-3331 • FAX: (617)782-7416

FR Series of 5 to 6 Watt DC/DC Converters

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS	NOTES:
GENERAL:						
Switching Frequency	180	200	220	KHz		1. No derating required up to a maximum case temperature of 85°C. Internal Power Dissipation =Pout%r*%r(1-Eff)/Eff.
Isolation Voltage:						
Input to Output	500			VDC		
Input to Case					Note 4	
Output to Case					Note 4	
Isolation Resistance:						
Input to Output	10%r9%r			Ohms		
Short Circuit Protection					Note 3	
ENVIRONMENTAL:						2. Provided for input fuse selection.
Operating Temperature	-25		85	°C	Note 1	
Storage Temperature	-40		125	°C	Ambient	
Operating Humidity			95%		Non-Condensing	3. Continuous Short Circuit Protection is provided. For dual output units the short circuit current on each individual output is equivalent to the short circuit current for a single output unit. Long term operation in this mode is not recommended. Converter will auto-restart once short has been removed.
Storage Humidity			95%		Non-Condensing	
INPUT:						
Input Voltage						
5 Vin	4.65	5.00	5.50	VDC		
12 Vin	10.90	12.00	13.20	VDC		
24 Vin	21.60	24.00	26.40	VDC		
28 Vin	25.20	28.00	30.80	VDC		
48 Vin	43.20	48.00	52.80	VDC		
Input Current						
5 Vin			1.96	Amps	Note 2	
12 Vin			0.82	Amps	Note 2	
24 Vin			0.43	Amps	Note 2	
28 Vin			0.37	Amps	Note 2	
48 Vin			0.21	Amps	Note 2	
Input Ripple Current			20%	Iin max		
Reverse Input Current			100%	Iin max		
OUTPUT:						4. For 48V input models, the case is connected to +Vin. For all other input voltages, the case is tied to either -Vout (Singles) or the Output Common (Duals).
Singles:						
Voltage Accuracy			±1.00%	Vout	Full Load	
Load Regulation			±0.15%	Vout	10% to 100%	
Line Regulation			±0.15%	Vout	LL to HL	
Duals:						
Voltage Accuracy						
+Vout			±1.00%	Vout	Full Load	
-Vout			±1.00%	Vout	Full Load	
Load Regulation						
+Vout			±0.15%	Vout	10% to 100%	
-Vout			±0.15%	Vout	10% to 100%	
Line Regulation			±0.25%	Vout	LL to HL	
Temp. Coefficient			±0.02%	/°C		
Voltage Stability			±0.05%	Vout		
Ripple and Noise			1.00%	Vout	p-p, 20 MHz BW	

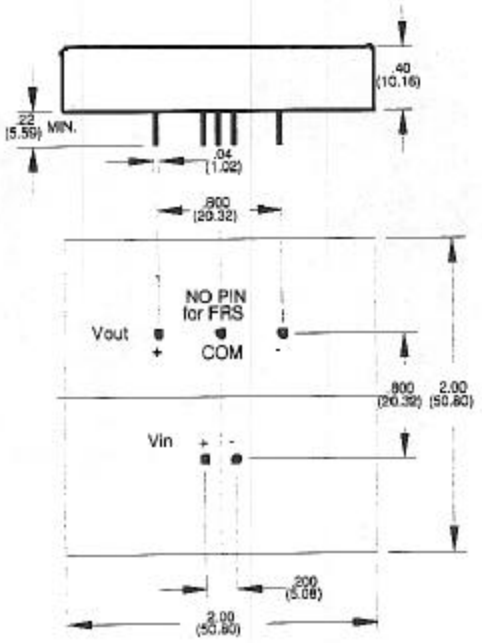
* All specifications typical at +25°C Nominal Line and Full Load unless otherwise noted.
* Specifications subject to change without notice.

FR Series of 5 to 6 Watt DC/DC Converters

PIN #	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	No Connect	Common
5	-Vout	-Vout

BOTTOM VIEW

Mechanical tolerances are ± 0.04"



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All Dimensions are in inches (MM)

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